QUIZZES

Practice test 1 unit 4

10 Questions

7 min

Topics

Types of progressive waves(Transverse waves,Longitudinal waves), Periodic waves(Transverse periodic waves, Longitudinal periodic waves)

Start Quiz

06 : 56

Q 1/10 7 min Hint

Q : The wavelength 'λ' of a wave depends on the speed 'v' of the wave and its frequency 'f'. Decide which of the following is correct?

A $f = \frac{v}{\lambda}$

B $f = v\lambda$

C $f = \frac{\lambda}{v}$

D $f = v\lambda^{-2}$

06 : 53

Q 2/10 7 min Hint

Q : The waves, in which the particles of the medium vibrate in a direction perpendicular to the direction of wave motion, is known as

A Transverse waves

B Longitudinal waves

C Propagated waves

D Magnetic waves

06 : 52

Q 3/10 7 min Hint

Q : A boat at anchor is rocked by waves, whose crests are 100m apart and velocity is 25m/s. The boat bounces up once in every

A 2500s

B 75s

C 4s

D 0.25s

06 : 50

Q 4/10 7 min Hint

Q : What are the essential properties a medium must possess for the propagation of mechanical waves?

A Stable pressure

B Maximum friction

C Constant temperature

D Minimum friction

06 : 48

Q 5/10 7 min Hint

Q : The diagram below shows the propagation of a wave. Which points are in same phase

A F, G

B C and E

C B and G

D B and F

06 : 46

Q 6/10 7 min Hint

Q : The diagram below shows an instantaneous position of a string as a transverse progressive wave travels along it from

left to right Which one of the following correctly shows the direction of the velocity of the points 1, 2 and 3 on the string

A 1 -→ 2-→3-→

B 1 -→ 2-←3-→

C 1 -↓ 2-↓3-↓

D 1 -↓ 2-↑3-↓article velocity

06 : 44

Q 7/10 7 min Hint

Q : The distance between two consecutive crests in a wave train produced in a string is 5 cm. If 2 complete waves pass through any point per second, the velocity of the wave is

A 10 cm/sec

B 2.5 cm/sec

C 5 cm/sec

D 15 cm/sec

06 : 43

Q 8/10 7 min Hint

Q : If velocity of sound in a gas is 360 m/s and the distance between a compression and the nearest rarefaction is 1m, then the frequency of sound is

A 90 Hz

B 180 Hz

C 360 Hz

D 720 Hz

06 : 41

Q 9/10 7 min Hint

Q : Which of the following is different from others

A Velocity

B Wavelength

C Frequency

D Amplitude

06 : 39

10/10 | 7 min | Hint

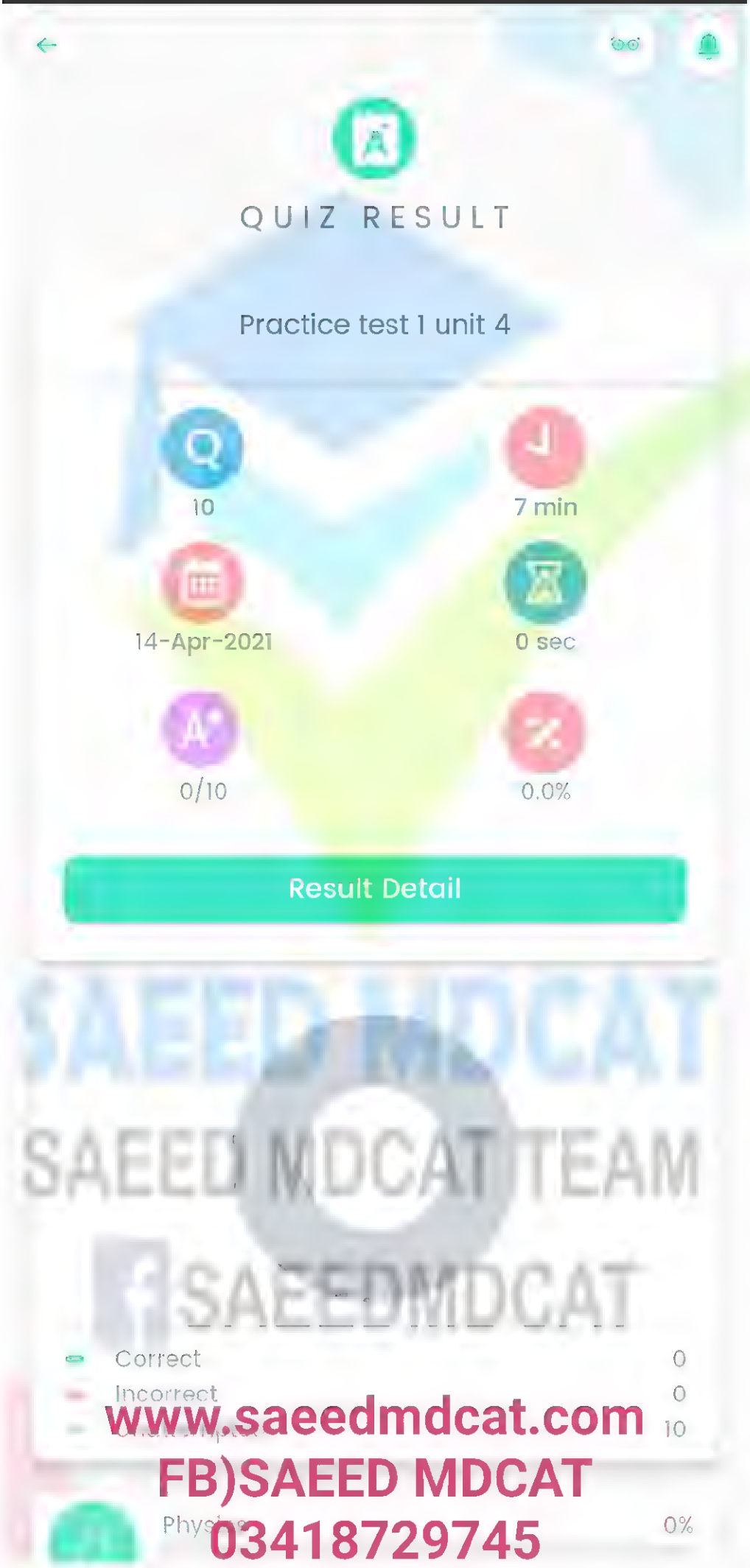
Q : The type of waves that can be propagated through solid is

A Transverse

B Longitudinal

C Both (a) and (b)

D None of these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← Practice test 1 un't 4

Correct | Unattempted

Incorrect | 1/10

Q : The wavelength 'λ' of a wave depends on the speed 'v' of the wave and its frequency 'f'. Decide which of the following is correct?

A $f = \frac{v}{\lambda}$

B $f = v\lambda$

C $f = \frac{\lambda}{v}$

D $f = v\lambda^{-2}$

Explanation

$v = f\lambda \Rightarrow f = \frac{v}{\lambda}$

1 2 3 4 5 6 7 8 9

Practice test 1 un't 4

Correct

Unattempted

Incorrect

2/10

Q : The waves, in which the particles of the medium vibrate in a direction perpendicular to the direction of wave motion, is known as

A Transverse waves

B Longitudinal waves

C Propagated waves

D Magnetic waves

Explanation

In transverse waves, particles of the medium vibrate in a direction perpendicular of the wave

1 2 3 4 5 6 7 8 9

Practice test 1 un't 4

Correct

Unattempted

Incorrect

3/10

Q : A boat at anchor is rocked by waves, whose crests are 100m apart and velocity is 25m/s. The boat bounces up once in every

A 2500s

B 75s

C 4s

D 0.25s

Explanation

ʎ=100m, v=25m/s
T=ʎ/v=100/25=4s.

Practice test 1 un't 4

Correct

Unattempted

Incorrect

4/10

Q : What are the essential properties a medium must possess for the propagation of mechanical waves?

A Stable pressure

B Maximum friction

C Constant temperature

D Minimum friction

Explanation

The friction force amongst the particles of the medium should be negligibly small so that they continue oscillating for a sufficiently long time and the wave travels a sufficiently long distance through the medium

1 2 3 4 5 6 7 8 9

Practice test 1 un't 4

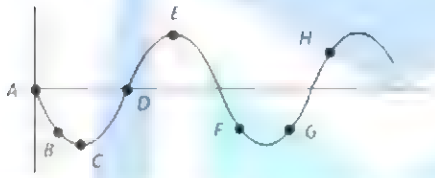
Correct

Unattempted

Incorrect

5/10

Q : The diagram below shows the propagation of a wave. Which points are in same phase



A F, G

B C and E

C B and G

D B and F

Explanation

Points B and F are in same phase ass they are l distance apart.

1 2 3 4 5 6 7 8 9

Correct

Unattempted

Incorrect

6/10

Q : The diagram below shows an instantaneous position of a string as a transverse progressive wave travels along it from

left to right Which one of the following correctly shows the direction of the velocity of the points 1, 2 and 3 on the string

A 1 -→ 2-→3-→

B 1 -→ 2-←3-→

C 1 -↓ 2-↓3-↓

D 1 -↓ 2-↑3-↓article velocity

Explanation

(vp)=−v×
Slope of the graph at that point At point 1 : Slope of the curve is positive, hence particle velocity is negative or downward (¯) At point 2 : Slope negative, hence particle velocity is positive or upwards () At point 3 : Again slope of the curve is positive, hence particle velocity is negative or downward (¯)

Practice test 1 un't 4

Correct

Unattempted

Incorrect

7/10

Q : The distance between two consecutive crests in a wave train produced in a string is 5 cm. If 2 complete waves pass through any point per second, the velocity of the wave is

10 cm/sec

2.5 cm/sec

5 cm/sec

15 cm/sec

Explanation

$v=f\lambda=2\times5=10$ cm/sec

1 2 3 4 5 6 7 8 9

Correct
Unattempted
Incorrect
8/10

Q : If velocity of sound in a gas is 360 m/s and the distance between a compression and the nearest rarefaction is 1m, then the frequency of sound is

A 90 Hz

B 180 Hz

C 360 Hz

D 720 Hz

Explanation

Distance between a compression and the nearest rarefaction is
$\lambda/2=1m$.
Hence
$f=v/\lambda=360/2=180Hz$

Practice test 1 un't 4

Correct

Unattempted

Incorrect

9/10

Q : Which of the following is different from others

A Velocity

B Wavelength

C Frequency

D Amplitude

1 2 3 4 5 6 7 8 9

Correct
Unattempted
Incorrect
10/10

Q : The type of waves that can be propagated through solid is

A Transverse

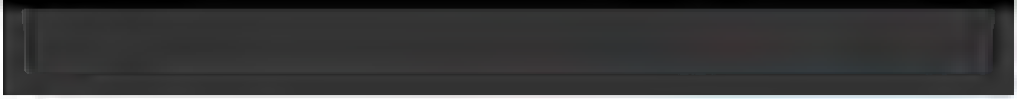
B Longitudinal

C Both (a) and (b)

D None of these

Explanation

Since solid has both the properties (rigidity and elasticity)



QUIZZES

Practice test 2 unit 4

10 Questions

7 min

Topics

of superpo

ound waves

Start Quiz

06 : 58

1/10 7 min Hint

Q : The ratio of speed of sound in hydrogen to the speed of sound in oxygen is:

A 1:2

B 2:1

C 1:4

D 4:1

1 2 3 4 5 6 7 8 9

06 : 57

2/10 | 7 min | Hint

Q : At what temperature the velocity of sound in air is two times its velocity at 10°C:

A 859 K

B 10°C

C 1132 K

D 890 °C

1 2 3 4 5 6 7 8 9

06 : 55

3/10 7 min Hint

Q : Velocity of sound in vacuum at 0^0C is

A 340m/sec

B 332 m/sec

C 280 m/sec

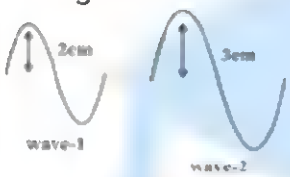
D zero

1 2 3 4 5 6 7 8 9

06 : 53

4/10 7 min Hint

Q : Two identical waves of different amplitudes are shown in the figure. What will be the ratio of their intensities?



A 9:4

B 3:2

C 5:1

D 4:9

06 : 51

5/10 | 7 min | Hint

Q : If pressure of a medium is increased by four times, then velocity of sound

A. Increases by four times

B. Decreases by four times

C. Increases by two times

D. Remains unchanged

1 2 3 4 5 6 7 8 9

06 : 49

6/10 7 min Hint

Q : Due to a distant explosion, what is the relation between ground tremor and sound

A Both are heard at the same time

B Ground tremor is heard first

C Sound is heard first

D Can not be predicted

1 2 3 4 5 6 7 8 9

06 : 47

7/10 | 7 min | Hint

Q : A point source emits sound equally in all directions in a non-absorbing medium, Two points P and Q are at distance of 2m and 3m respectively from the source. The ratio of the intensities of the waves at P and Q is

A) 9 : 4

B) 2 : 3

C) 3 : 2

D) 4 : 9

06 : 44

8/10 7 min Hint

Q : The minimum intensity of sound is zero at a point due to two sources of nearly equal frequencies, when

A Two sources are vibrating in opposite phase

B The amplitude of two sources are equal

C At the point of observation, the amplitudes of two S.H.M. produced by two sources are equal and both the S.H.M. are along the same straight line

D Both the sources are in the same phase

1 2 3 4 5 6 7 8 9

06 : 42

9/10 7 min Hint

Q : If the ratio of amplitude of wave is 2 : 1, then the ratio of maximum and minimum intensity is

A 9 : 1

B 1 : 9

C 4 : 1

D 1 : 4

1 2 3 4 5 6 7 8

06 : 38

10/10 | 7 min | Hint

Q :

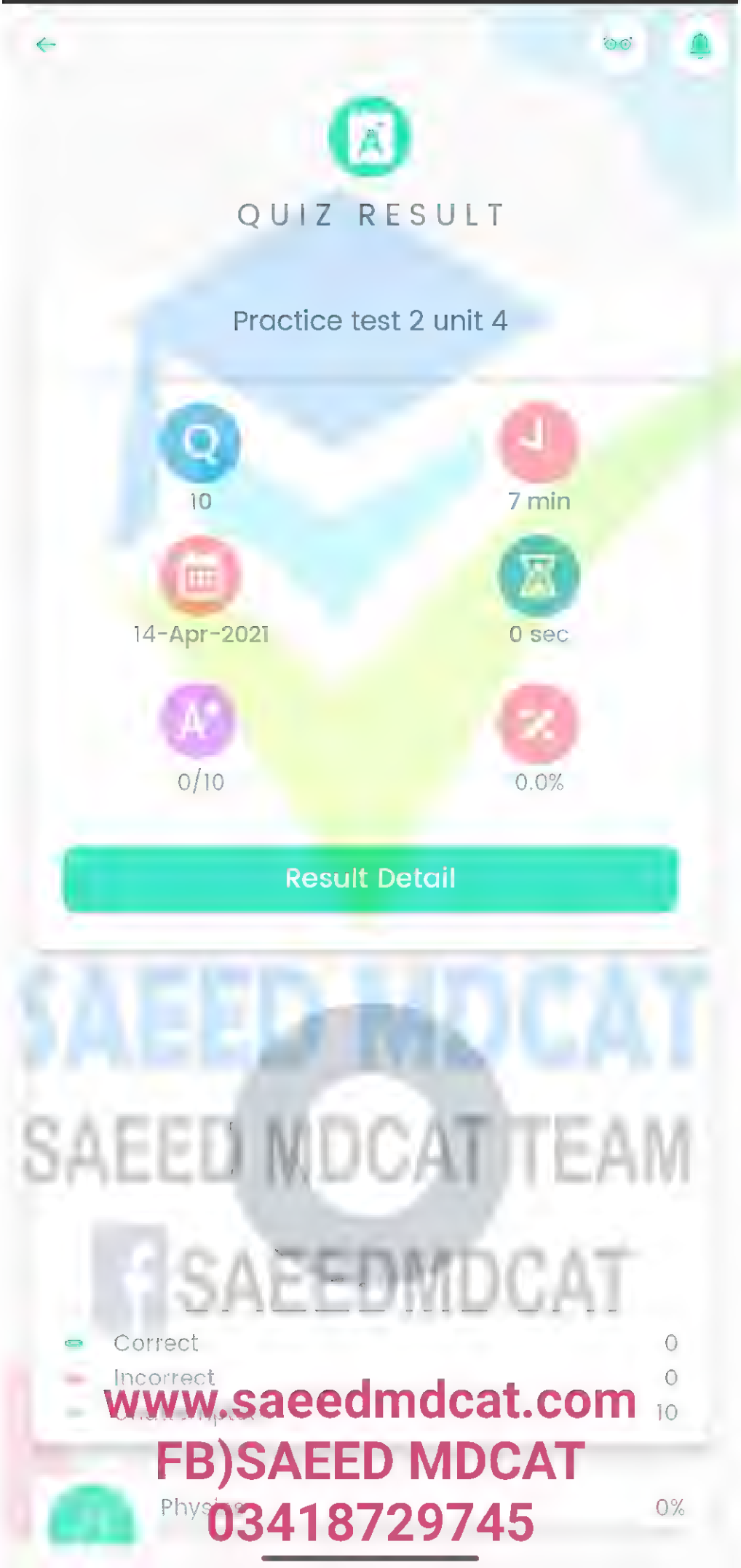
Human ears can sense sound waves travel ling in air having wavelength of

A 10^{-3}m

B 10^{-2}m

C 1m

D 10^{2}m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Practice test 2 unit 4

Correct

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Incorrect

1/10

Q : The ratio of speed of sound in hydrogen to the speed of sound in oxygen is:

A 1:2

B 2:1

C 1:4

D 4:1

Explanation

$$\frac{v_H}{v_o} = \sqrt{\frac{\rho_0}{\rho_H}}$$

$$\frac{v_H}{v_o} = \sqrt{\frac{16\rho_H}{\rho_H}}$$

$v_H : v_o = 4:1$

Correct
Unattempted
Incorrect
2/10

Q : At what temperature the velocity of sound in air is two times its velocity at 10°C:

859 K

10°C

1132 K

890 °C

Explanation

$T_1 = 10°C$

$T_1 = 10 + 273$

$T = 283k$

$T_2 = n^2 T_1$ (only applicable when 'T' in kelvin)

$T_2 = 2^2(283)$

$T_2 = 1132K$

Practice test 2 unit 4

Correct

Unattempted

Incorrect

3/10

Q : Velocity of sound in vacuum at 0^0C is

A 340m/sec

B 332 m/sec

C 280 m/sec

D zero

Explanation

Sound wave is a mechanical wave. So sound can't propagate through vacuum and its velocity in vacuum is zero.

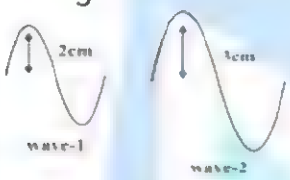
Correct

Unattempted

Incorrect

4/10

Q : Two identical waves of different amplitudes are shown in the figure. What will be the ratio of their intensities?



A 9:4

B 3:2

C 5:1

D 4:9

Explanation

Intensity $\propto$ (amplitude)^2 $\Rightarrow \frac{I_1}{I_2} = \frac{A_1^2}{A_2^2} = \frac{(2)^2}{(3)^2} = \frac{4}{9}$

Practice test 2 unit 4

Correct

Unattempted

Incorrect

5/10

Q : If pressure of a medium is increased by four times, then velocity of sound

A Increases by four times

B Decreases by four times

C Increases by two times

D Remains unchanged

1 2 3 4 5 6 7 8 9

Practice test 2 unit 4

Correct

Unattempted

Incorrect

6/10

Q : Due to a distant explosion, what is the relation between ground tremor and sound

A Both are heard at the same time

B Ground tremor is heard first

C Sound is heard first

D Can not be predicted

Explanation

Speed of sound is more in solids than in gases.

Correct

Unattempted

Incorrect

8/10

Q : The minimum intensity of sound is zero at a point due to two sources of nearly equal frequencies, when

A. Two sources are vibrating in opposite phase

B. The amplitude of two sources are equal

C. At the point of observation, the amplitudes of two S.H.M. produced by two sources are equal and both the S.H.M. are along the same straight line

D. Both the sources are in the same phase

Explanation

If two waves of nearly equal frequency superpose, they give beats if they both travel in straight line and $I_{min}=0$ if they have equal amplitudes.

Correct

Unattempted

Incorrect

9/10

Q : If the ratio of amplitude of wave is 2 : 1, then the ratio of maximum and minimum intensity is

A 9 : 1

B 1 : 9

C 4 : 1

D 1 : 4

Explanation

$$\frac{I_{max}}{I_{min}} = \left(\frac{\frac{a_1}{a_2}+1}{\frac{a_1}{a_2}-1}\right)^2 = \left(\frac{2+1}{2-1}\right)^2 = 9/1$$

Practice test 2 unit 4

Correct

Unattempted

Incorrect

10/10

Q :

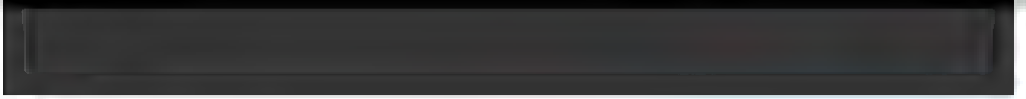
Human ears can sense sound waves travel ling in air having wavelength of

A 10^{-3}m

B 10^{-2}m

C 1m

D 10^{2}m



QUIZZES

Practice test 3 unit 4

10 Questions

7 min

Topics

Start Quiz

06 : 58

1/10 | 7 min | Hint

Q : A stretched string of length 1 m vibrates with a fundamental frequency of 1 Hz. The velocity of wave is

A 2 m/s

B 1 m/s

C 3 m/s

D 4 m/s

1 2 3 4 5 6 7 8 9

06 : 56

2/10 7 min Hint

Q : If tension in a string is made four times then speed of wave becomes

A four times

B one times

C double

D none

1 2 3 4 5 6 7 8 9

06 : 54

3/10 | 7 min | Hint

Q : Only odd harmonics are present in

A Open pipe only

B Closed pipe only

C Both open and closed pipes

D Stretched string

1 2 3 4 5 6 7 8 9

06 : 52

4/10 | 7 min | Hint

Q : Energy is not carried by:

A Longitudinal progressive waves

B Electromagnetic waves

C Transverse progressive waves

D Stationary wave

1 2 3 4 5 6 7 8 9

06 : 50

5/10 7 min Hint

Q : Which type of wave is produced in a resonance tube?

A Longitudinal

B Transverse stationary

C Transverse

D Longitudinal stationary

1 2 3 4 5 6 7 8 9

06 : 48

6/10 | 7 min | Hint

Q : In stationary wave

A Strain is maximum at nodes

B Strain is maximum at antinodes

C Strain is minimum at nodes

D Amplitude is zero at all the points

06 : 47

7/10 | 7 min | Hint

Q : In stationary waves, antinodes are the points where there is

A. Minimum displacement and minimum pressure change

B. Minimum displacement and maximum pressure change

C. Maximum displacement and maximum pressure change

D. Maximum displacement and minimum pressure change

1 2 3 4 5 6 7 8 9

06 : 45

8/10 | 7 min | Hint

Q : Stationary waves are so called because in them

A. The particles of the medium are not disturbed at all

B. The particles of the medium do not execute SHM

C. There occurs no flow of energy along the wave

D. The interference effect can't be observed

1 2 3 4 5 6 7 8 9

06 : 43

9/10 | 7 min | Hint

Q : A string in musical instrument is 50 cm long and its fundamental frequency (n) is 800 Hz. If a frequency (n) of 1000 Hz is to be produced, then required length of string is

A 62.5 cm

B 50 cm

C 40 cm

D 37.5 cm

06 : 40

10/10 | 7 min | Hint

Q :

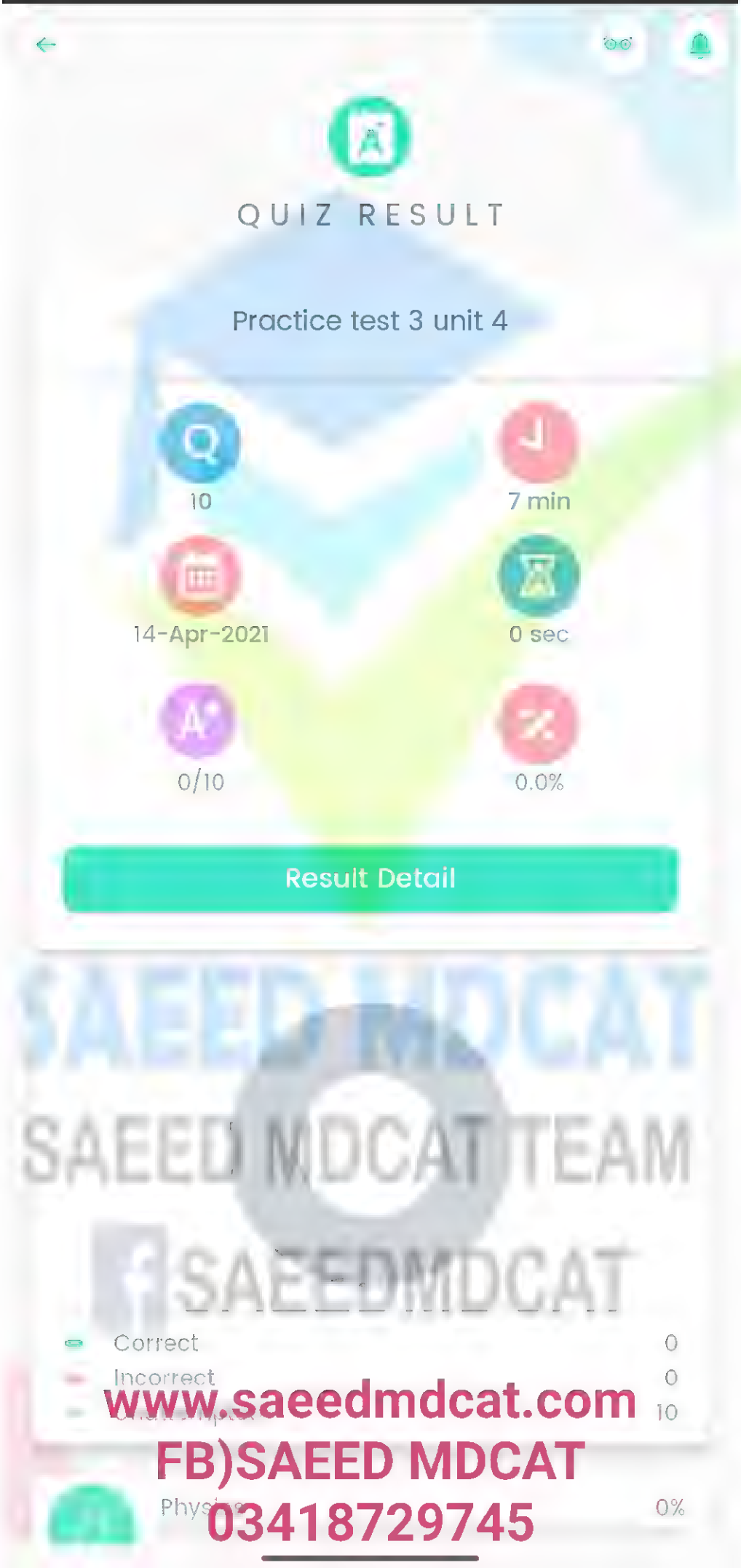
In a sitar wire which one of the following types of vibration is produced?

A Progressive longitudinal

B Stationary longitudinal

C Progressive transverse

D Stationary transverse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Practice test 3 unit 4

Correct

Unattempted

Incorrect

1/10

Q : A stretched string of length 1 m vibrates with a fundamental frequency of 1 Hz. The velocity of wave is

2 m/s

1 m/s

3 m/s

4 m/s

Practice test 3 unit 4

Correct

Unattempted

Incorrect

2/10

Q : If tension in a string is made four times then speed of wave becomes

four times

one times

double

none

Explanation

$$v = \sqrt{\frac{F}{m}}$$

$$v' = \sqrt{\frac{4F}{m}}$$

$$v' = 2\sqrt{\frac{F}{m}}$$

$$v' = 2v$$

1 2 3 4 5 6 7 8 9

Practice test 3 unit 4

Correct

Unattempted

Incorrect

3/10

Q : Only odd harmonics are present in

A Open pipe only

B Closed pipe only

C Both open and closed pipes

D Stretched string

Practice test 3 unit 4

Correct

Unattempted

Incorrect

4/10

Q : Energy is not carried by:

A Longitudinal progressive waves

B Electromagnetic waves

C Transverse progressive waves

D Stationary wave

Explanation

Stationary waves don't transfer energy of momentum.

Practice test 3 unit 4

Correct

Unattempted

Incorrect

5/10

Q : Which type of wave is produced in a resonance tube?

A Longitudinal

B Transverse stationary

C Transverse

D Longitudinal stationary

Explanation

Longitudinal stationary waves

Practice test 3 unit 4

Correct

Unattempted

Incorrect

6/10

Q : In stationary wave

A Strain is maximum at nodes

B Strain is maximum at antinodes

C Strain is minimum at nodes

D Amplitude is zero at all the points

Explanation

At nodes pressure change (strain) is maximum

Practice test 3 unit 4

Correct

Unattempted

Incorrect

7/10

Q : In stationary waves, antinodes are the points where there is

A Minimum displacement and minimum pressure change

B Minimum displacement and maximum pressure change

C Maximum displacement and maximum pressure change

D Maximum displacement and minimum pressure change

1 2 3 4 5 6 7 8 9

Practice test 3 unit 4

Correct

Unattempted

Incorrect

8/10

Q : Stationary waves are so called because in them

A The particles of the medium are not disturbed at all

B The particles of the medium do not execute SHM

C There occurs no flow of energy along the wave

D The interference effect can't be observed

1 2 3 4 5 6 7 8 9

Correct
Unattempted
Incorrect
9/10

Q : A string in musical instrument is 50 cm long and its fundamental frequency (n) is 800 Hz. If a frequency (n) of 1000 Hz is to be produced, then required length of string is

A 62.5 cm

B 50 cm

C 40 cm

D 37.5 cm

Explanation

$$n_1 l_1 = n_2 l_2 \Rightarrow 800 \times 50 = 1000 \times l_2 \Rightarrow l_2 = 40cm$$

Practice test 3 unit 4

Correct

Unattempted

Incorrect

10/10

Q :

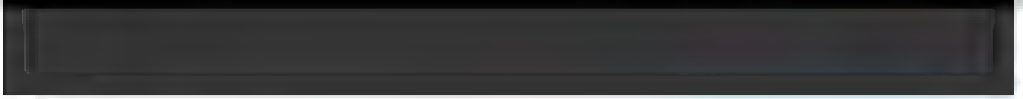
In a sitar wire which one of the following types of vibration is produced?

A Progressive longitudinal

B Stationary longitudinal

C Progressive transverse

D Stationary transverse



QUIZZES

Practice test 5 unit 4

10 Questions

7 min

Topics

Start Quiz

06 : 58

1/10 | 7 min | Hint

Q : A car blowing a horn of frequency 350 Hz is moving normally towards a wall with a speed of 5 m/s. The beat frequency heard by a person standing between the car and the wall is (speed of sound is air=350 m/s)

A zero

B 3.5 Hz

C 5 Hz

D 10 Hz

1 2 3 4 5 6 7 8 9

06 : 55

2/10 7 min Hint

Q : If the star is moving away from the earth; the wavelength of the waves emitted from the star have a

A Longer wavelength

B Smaller wavelength

C No shift

D Yellow shift

1 2 3 4 5 6 7 8 9

06 : 53

3/10 | 7 min | Hint

Q : An observer is moving towards stationary source with velocity $\frac{v}{3}$. The apparent frequency would be if v is the speed of sound and f is the original frequency

A $(\frac{4}{3})$ f

B $(\frac{2}{3})$ f

C $(\frac{3}{4})$ f

D $(\frac{3}{2})$ f

1 2 3 4 5 6 7 8 9

06 : 50

4/10 7 min Hint

Q :

A source of sound of frequency 450 cycles/sec is moving towards a stationary observer with 34 m/sec speed. If the speed of sound is 340 m/sec, then the apparent frequency will be

A 410 cycles/sec

B 550 cycles/sec

C 500 cycles/sec

D 450 cycles/sec

1 2 3 4 5 6 7 8 9

06 : 47

5/10 | 7 min | Hint

Q : An observer with velocity u_0 is receding from a sound source of frequency f and wavelength λ then number of waves received in one second by the observer if speed of sound is v.

A $\frac{\lambda}{V-u_o}$

B $\frac{V-u_o}{\lambda}$

C $\left(\frac{V}{V-u_o}\right)f$

D $\left(\frac{V}{V+u_o}\right)f$

06 : 45

6/10 | 7 min | Hint

Q : Assuming that universe is expanding, if the spectrum of light coming from a star which is going away from earth is tested, then in the wavelength of light

A There will be no change

B The spectrum will move to infrared region

C The spectrum will seems to shift to ultraviolet side

D None of the above

1 2 3 4 5 6 7 8 9

06 : 43

7/10 | 7 min | Hint

Q : The velocity of light emitted by a source S observed by an observer O, who is at rest with respect to S is c. If the observer moves towards S with velocity v, the velocity of light as observed will be

A. c + v

B. c−v

C. c

D. 2c

06 : 41

8/10 7 min Hint

Q : Due to Doppler's effect, the shift in wavelength observed is 0.1 Å for a star producing wavelength 6000 Å. Velocity of recession of the star will be

A 2.5 km/s

B 10 km/s

C 5 km/s

D 20 km/s

1 2 3 4 5 6 7 8 9

06 : 39

9/10 | 7 min | Hint

Q : The apparent frequency in Doppler's effect does not depend upon

A Speed of the observer

B Distance between the observer and source

C Speed of the source

D Frequency of the source

06 : 35

10/10 | 7 min | Hint

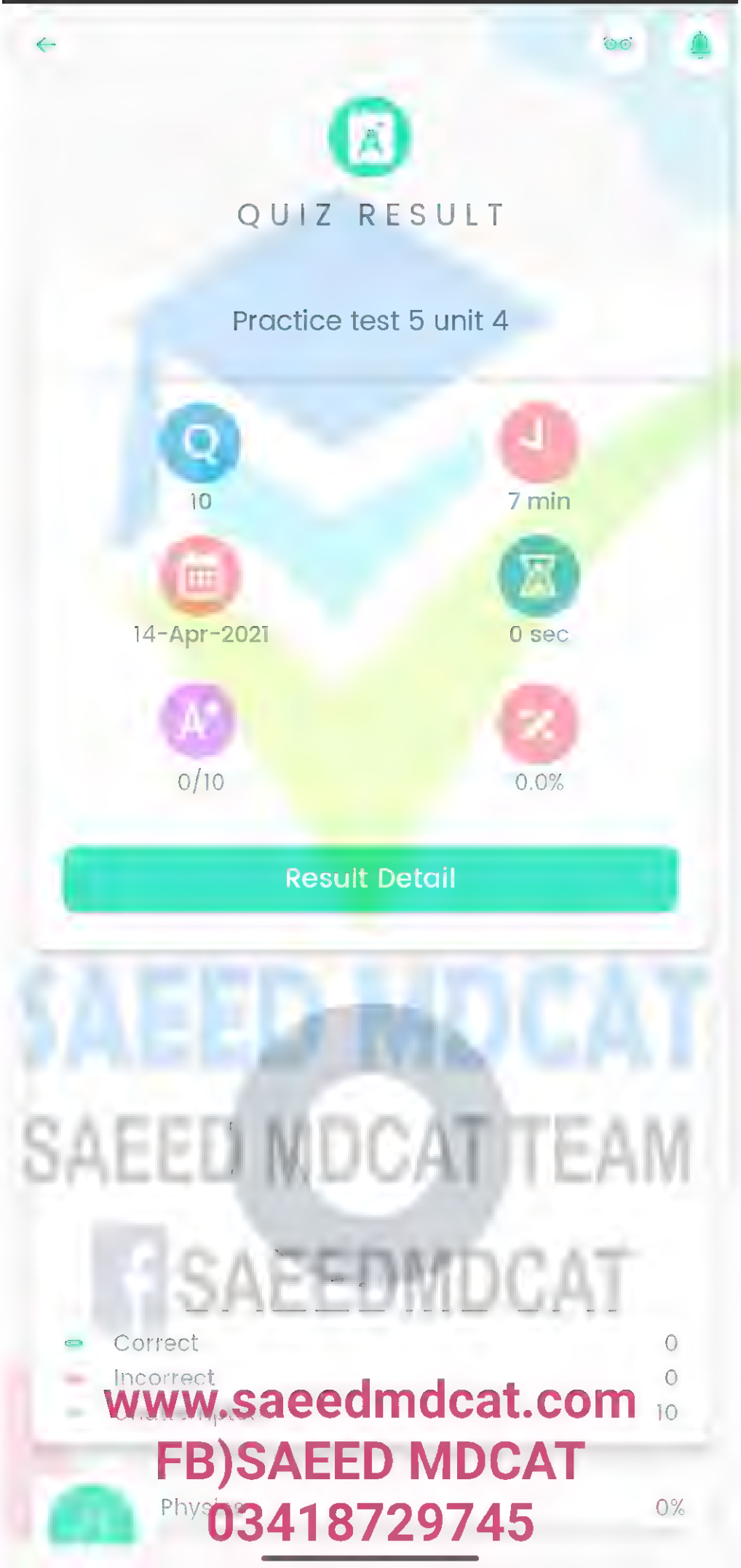
Q : A car sounding its horn at 480Hz moves towards a high wall at a speed of 20m/s, the frequency of the reflected sound heard by the man sitting in the car will be nearest to

A 480Hz

B 510Hz

C 540Hz

D 570Hz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Correct
Unattempted
Incorrect
1/10

Q : A car blowing a horn of frequency 350 Hz is moving normally towards a wall with a speed of 5 m/s. The beat frequency heard by a person standing between the car and the wall is (speed of sound is air=350 m/s)

zero

3.5 Hz

5 Hz

10 Hz

Explanation

As

$$f' = \left(\frac{v}{v - u_s}\right) f$$

$$= \left(\frac{350}{350 - 5}\right)(350)$$

$$350 ms^{-1}$$

For beat frequency

$$n = f^1 - f$$

$$\approx 0$$

Practice test 5 unit 4

Correct

Unattempted

Incorrect

2/10

Q : If the star is moving away from the earth; the wavelength of the waves emitted from the star have a

A Longer wavelength

Smaller wavelength

No shift

Yellow shift

1 2 3 4 5 6 7 8 9

Correct | Unattempted

Incorrect | 3/10

Q : An observer is moving towards stationary source with velocity $\frac{v}{3}$. The apparent frequency would be if v is the speed of sound and f is the original frequency

A $(\frac{4}{3})$ f

B $(\frac{2}{3})$ f

C $(\frac{3}{4})$ f

D $(\frac{3}{2})$ f

Explanation

$$f_A = \left(\frac{v + \frac{v}{3}}{v}\right) f = \left(\frac{4v}{3v}\right) f$$

$$f_A = \left(\frac{4}{3}\right) f$$

Correct
Unattempted
Incorrect
4/10

Q :

A source of sound of frequency 450 cycles/sec is moving towards a stationary observer with 34 m/sec speed. If the speed of sound is 340 m/sec, then the apparent frequency will be

A 410 cycles/sec

B 550 cycles/sec

C 500 cycles/sec

D 450 cycles/sec

Explanation

$$f^1 = \left(\frac{v}{v - u_s}\right) f$$

$$f^1 = \left(\frac{340}{340 - 34}\right) 450$$

$$f^1 = 500 HZ$$

Correct | Unattempted

Incorrect | 5/10

Q : An observer with velocity u_0 is receding from a sound source of frequency f and wavelength λ then number of waves received in one second by the observer if speed of sound is v.

A $\frac{\lambda}{V-u_o}$

B $\frac{V-u_o}{\lambda}$

C $\left(\frac{V}{V-u_o}\right)f$

D $\left(\frac{V}{V+u_o}\right)f$

Explanation

$$f^1=(\frac{v-u_0}{v})f$$

$$f^1=(\frac{v-u_0}{v})\frac{v}{\lambda}$$

$$f^1=\frac{v-u_0}{\lambda}$$

← Practice test 5 unit 4

Correct | Unattempted

Incorrect | 6/10

Q : Assuming that universe is expanding, if the spectrum of light coming from a star which is going away from earth is tested, then in the wavelength of light

A There will be no change

B The spectrum will move to infrared region

C The spectrum will seems to shift to ultraviolet side

D None of the above

Explanation

Due to expansion of universe, the star will go away from the earth thereby increasing the observed wavelength. Therefore the spectrum will shift to the infrared region.

Practice test 5 unit 4

Correct

Unattempted

Incorrect

7/10

Q : The velocity of light emitted by a source S observed by an observer O, who is at rest with respect to S is c. If the observer moves towards S with velocity v, the velocity of light as observed will be

A c + v

B c-v

C c

D 2c

Correct
Unattempted
Incorrect
8/10

Q : Due to Doppler's effect, the shift in wavelength observed is 0.1 Å for a star producing wavelength 6000 Å. Velocity of recession of the star will be

A 2.5 km/s

B 10 km/s

C 5 km/s

D 20 km/s

Explanation

$$\frac{\Delta\lambda}{\lambda} = \frac{v}{c} \quad \therefore v = \frac{\Delta\lambda}{\lambda}c = \frac{0.1}{6000} \times 3 \times 10^5 km/s = 5\ km/$$

Practice test 5 unit 4

Correct

Unattempted

Incorrect

9/10

Q : The apparent frequency in Doppler's effect does not depend upon

A. Speed of the observer

B. Distance between the observer and source

C. Speed of the source

D. Frequency of the source

Explanation

Apparent frequency in Doppler's effect depends on frequency of source, direction and velocity of source and observer. It does not depend on the distance between observer and source.

Practice test 5 unit 4

Correct | Unattempted

Incorrect | 10/10

Q : A car sounding its horn at 480Hz moves towards a high wall at a speed of 20m/s, the frequency of the reflected sound heard by the man sitting in the car will be nearest to

A 480Hz

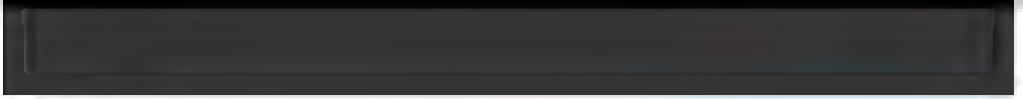
B 510Hz

C 540Hz

D 570Hz

Explanation

After reflection from the wall, the sound moves towards observer in the car,
$\gamma' = (v+v0)/(v-vs) \times \gamma = (340+20)/(340-20) \times 480 = 540Hz$.



QUIZZES

Practice test 6 unit 4

10 Questions

7 min

Topics

rmonic mot

nstantaneous displacement, Time p

Start Quiz

06 : 58

1/10 | 7 min | Hint

Q : The frequency of wave is 0.002 Hz. Its time period is:

A 100 s

B 5000 s

C 500 s

D 50 s

06 : 56

2/10 | 7 min | Hint

Q : The product of frequency and time period is:

A 4

B 1

C 2

D 6

1 2 3 4 5 6 7 8 9

06 : 54

3/10 | 7 min | Hint

Q :

A body performs simple harmonic motion with a period of 0.063s. The maximum speed of the body is 3.0 ms^{-1}. What are the values of the amplitude x_0 (m) and angular frequency w ($rads^{-1}$)?

A $x_0 = 0.03, w = 100$

B $x_0 = 0.19, w = 16$

C $x_0 = 5.3, w = 16$

D $x_0 = 3.3, w = 100$

06 : 52

4/10 7 min Hint

Q :

If the time period of the oscillation is 20 mirco-sec, than what will be the frequency of that oscillating body?

A 5000 Hz

B 50000 Hz

C 20000 Hz

D 1000 Hz

1 2 3 4 5 6 7 8 9

06 : 50

5/10 7 min Hint

Q :

The acceleration of a particle performing S.H.M. is 12 cm/sec^2 at a distance of 3 cm from the mean position. Its time period is

A 0.5 sec

B 1.0 sec

C 2.0 sec

D 3.14 sec

1 2 3 4 5 6 7 8 9

06 : 48

6/10 7 min Hint

Q :

Which of the following is a necessary and sufficient condition for S.H.M

A Constant period

B Constant acceleration

C Proportionality between acceleration and displacement from equilibrium position

D Proportionality between restoring force and displacement from equilibrium position

1 2 3 4 5 6 7 8 9

06 : 46

7/10 | 7 min | Hint

Q :

The phase (at a time t) of a particle in simple harmonic motion tells

A. Only the position of the particle at time t

B. Only the direction of motion of the particle at time t

C. Both the position and direction of motion of the particle at time t

D. Neither the position of the particle nor its direction of motion at time t

06 : 42

8/10 | 7 min | Hint

Q :

A particle is moving with constant angular velocity along the circumference of a circle. Which of the following statements is true

a. The particle so moving executes S.H.M

b. The projection of the particle on any one of the diameters executes S.H.M.

c. The projection of the particle on any of the diameters executes S.H.M.

d. None of the above

06 : 40

9/10 | 7 min | Hint

Q :

A simple harmonic motion is represented by $F(t)=10\sin(20t+0.5)$ The amplitude of the S.H.M. is

A a = 30

B a = 20

C a = 10

D a = 5

06 : 36

10/10 | 7 min | Hint

Q :

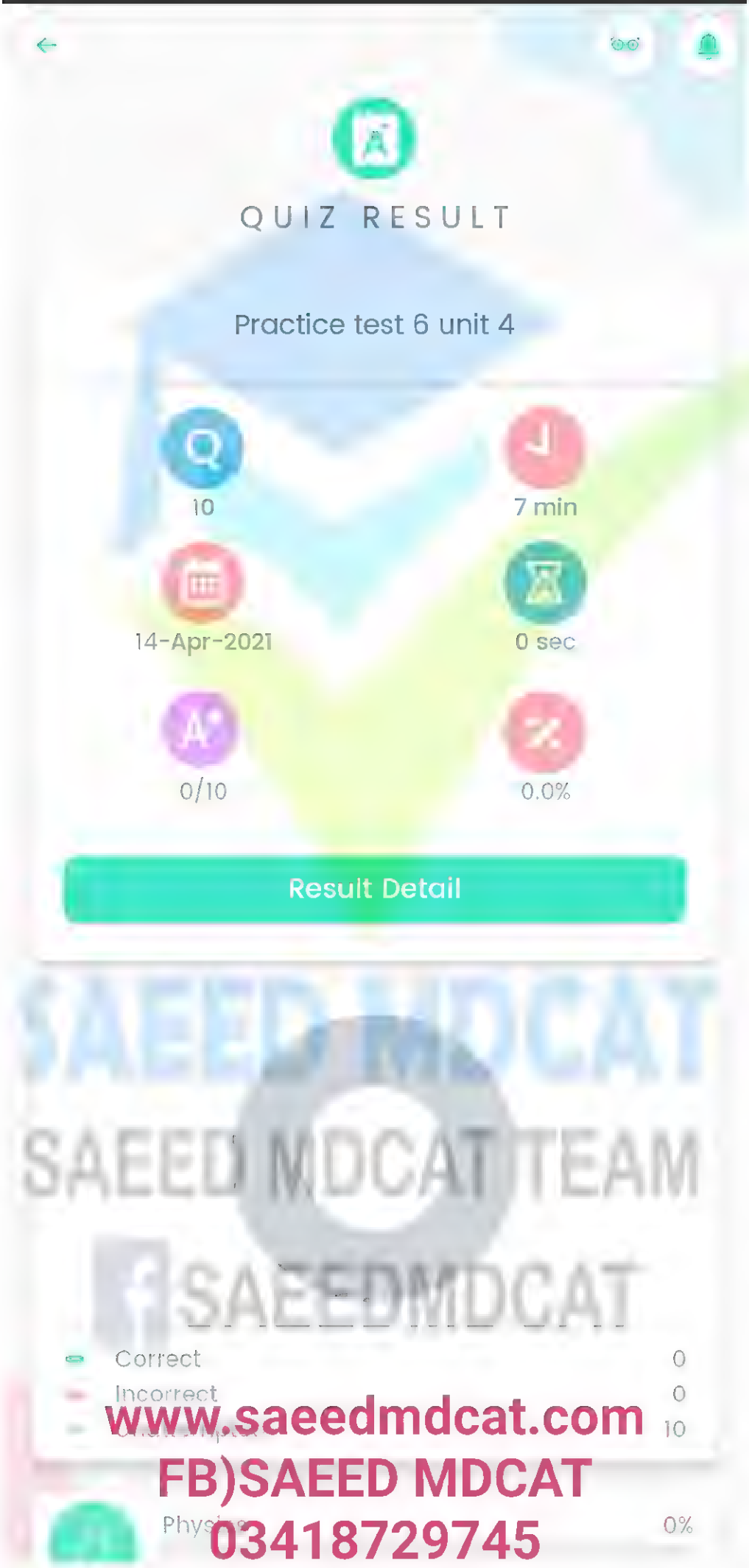
A particle executing simple harmonic motion along y-axis has its motion described by the equation $y=A\sin(\omega t)+B$. The amplitude of the simple harmonic motion is

a) A

b) B

c) A+B

d) A-B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Correct
Unattempted
Incorrect
1/10

Q : The frequency of wave is 0.002 Hz. Its time period is:

A 100 s
B 5000 s
C 500 s
D 50 s

Explanation

$$T = \frac{1}{f} = \frac{1}{0.002}$$

$T = 500\text{sec}$

Practice test 6 unit 4

Correct

Unattempted

Incorrect

2/10

Q : The product of frequency and time period is:

A 4

B 1

C 2

D 6

Explanation

$$f = \frac{1}{T}$$

$$f \times T = 1$$

Correct

Unattempted

Incorrect

3/10

Q :

A body performs simple harmonic motion with a period of 0.063s. The maximum speed of the body is 3.0 ms ^{1}. What are the values of the amplitude x_0 (m) and angular frequency w (rads^{-1})?

$x_0 = 0.03, w = 100$

$x_0 = 0.19, w = 16$

$x_0 = 5.3, w = 16$

$x_0 = 3.3, w = 100$

Explanation

$$v_o = x_o\omega = 3 = x_o\left(\frac{2\pi}{T}\right) \Rightarrow x_o = 3\left(\frac{0.063}{2(3.14)}\right) = 0.03m$$

$$\omega = \frac{2\pi}{T} = \frac{2\times 3.14}{0.063} = 100 rad\,\sec^{-1}$$

Correct
Unattempted
Incorrect
4/10

Q :

If the time period of the oscillation is 20 mirco-sec, than what will be the frequency of that oscillating body?

A 5000 Hz

B 50000 Hz

C 20000 Hz

D 1000 Hz

Explanation

$$f = \frac{1}{T} = \frac{1}{20 \times 10^{-6}} = 50000 Hz$$

Correct
Unattempted
Incorrect
5/10

Q :

The acceleration of a particle performing S.H.M. is 12 cm/sec^2 at a distance of 3 cm from the mean position. Its time period is

A 0.5 sec

B 1.0 sec

C 2.0 sec

D 3.14 sec

Explanation

$$T = 2\pi\sqrt{\left|\frac{\text{Displacement}}{\text{Acceleration}}\right|} = 2\pi\sqrt{\frac{3}{12}} = \pi = 3.14$$

Correct

Unattempted

Incorrect

6/10

Q :

Which of the following is a necessary and sufficient condition for S.H.M

A Constant period

B Constant acceleration

C Proportionality between acceleration and displacement from equilibrium position

D Proportionality between restoring force and displacement from equilibrium position

Explanation

F=−kx

Practice test 6 unit 4

Correct

Unattempted

Incorrect

7/10

Q :

The phase (at a time t) of a particle in simple harmonic motion tells

A Only the position of the particle at time t

B Only the direction of motion of the particle at time t

C Both the position and direction of motion of the particle at time t

D Neither the position of the particle nor its direction of motion at time t

Explanation

Phase determine the position and direction of motion of particle excecuting SHM

Practice test 6 unit 4

Correct

Unattempted

Incorrect

8/10

Q :

A particle is moving with constant angular velocity along the circumference of a circle. Which of the following statements is true

A The particle so moving executes S.H.M

B The projection of the particle on any one of the diameters executes S.H.M.

C The projection of the particle on any of the diameters executes S.H.M.

D None of the above

Practice test 6 unit 4

Correct

Unattempted

Incorrect

9/10

Q :

A simple harmonic motion is represented by
F(t)=10sin(20t+0.5) The amplitude of the S.H.M. is

A a = 30

B a = 20

C a = 10

D a = 5

Practice test 6 unit 4

Correct | Unattempted

Incorrect | 10/10

Q :

A particle executing simple harmonic motion along y-axis has its motion described by the equation $y=A\sin(\omega t)+B$. The amplitude of the simple harmonic motion is

A

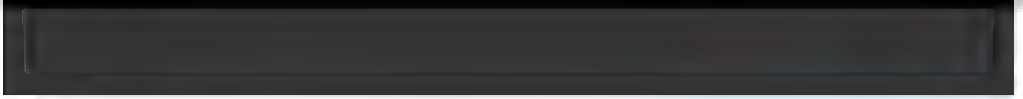
B

A+B

A-B

Explanation

The amplitude is a maximum displacement from the mean position.



QUIZZES

Practice test 7 unit 4

10 Questions

7 min

Topics

Start Quiz

06 : 58

1/10 | 7 min | Hint

Q : The total energy of a particle executing S.H.M. of amplitude A is proportional to

A. A^2

B. A^{-2}

C. A

D. 1/A

06 : 56

2/10 | 7 min | Hint

Q : The P.E of a particle executing SHM at a distance x from its equilibrium position is

A $\frac{1}{2}m\omega^2x^2$

B $\frac{1}{2}m\omega^2a^2$

C $\frac{1}{2}m\omega^2(a^2-x^2)$

D Zero

1 2 3 4 5 6 7 8 9

06 : 55

3/10 | 7 min | Hint

Q : The variation of P.E and K.E with displacement is essential for maintaining

A Oscilltions

B linear motion

C random motion

D translatory motion

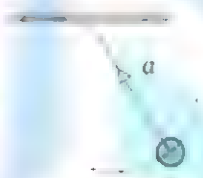
1 2 3 4 5 6 7 8 9

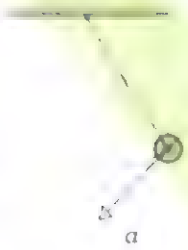
06 : 31

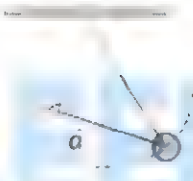
Q :

A simple pendulum is oscillating without damping. When the displacement of the bob is less than maximum, its acceleration vector

a is correctly shown in

A 

B 

C 

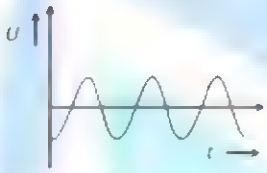
D 

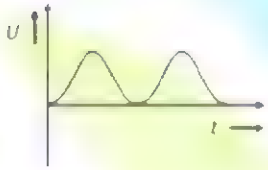
06 : 28

5/10 | 7 min | Hint

Q :

As a body performs S.H.M., its potential energy U. varies with time as indicated in

A 

B 

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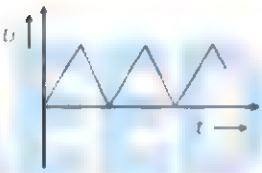
D 

06 : 26

6/10 | 7 min | Hint

Q :

If the length of the simple pendulum is increased by 44%, then what is the change in time period of pendulum

A 22%

B 20%

C 33%

D 44%

06 : 24

7/10 | 7 min | Hint

Q :

To show that a simple pendulum executes simple harmonic motion, it is necessary to assume that

A Length of the pendulum is small

B Mass of the pendulum is small

C Amplitude of oscillation is small

D Acceleration due to gravity is small

06 : 22

8/10 | 7 min | Hint

Q :

A simple pendulum is taken from the equator to the pole. Its period

A Decreases

B Increases

C Remains the same

D Decreases and then increases

06 : 20

9/10 | 7 min | Hint

Q :

Time period of a simple pendulum will be double, if we

A Decrease the length 2 times

B Decrease the length 4 times

C Increase the length 2 times

D Increase the length 4 times

06 : 15

10/10 | 7 min | Hint

Q :

Length of a simple pendulum is l and its maximum angular displacement is q, then its maximum K.E. is

A mglsinθ

B mgl(1+sinθ)

C mgl(1+cosθ)

D mgl(1−cosθ)

Correct
Unattempted
Incorrect
1/10

Q : The total energy of a particle executing S.H.M. of amplitude A is proportional to

A A^2

B A^{-2}

C A

D 1/A

Correct

Unattempted

Incorrect

2/10

Q : The P.E of a particle executing SHM at a distance x from its equilibrium position is

$\frac{1}{2}m\omega^2x^2$

$\frac{1}{2}m\omega^2a^2$

$\frac{1}{2}m\omega^2(a^2-x^2)$

Zero

Explanation

$$P.E = \frac{1}{2}Kx^2$$

$$\omega = \sqrt{\frac{K}{m}} \rightarrow K = \omega^2 m \therefore P.E = \frac{1}{2}\omega^2 m x^2$$

Correct
Unattempted
Incorrect
3/10

Q : The variation of P.E and K.E with displacement is essential for maintaining

- Oscilltions
- linear motion
- random motion
- translatory motion

Explanation

In oscillatory motion at mean position K.E is maximum, at extreme position P.E is maximum, so in ordered to conserve T.E, P.E must change into K.E and K.E into P.E

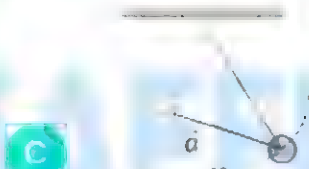
Q :

A simple pendulum is oscillating without damping. When the displacement of the bob is less than maximum, its acceleration vector

a is correctly shown in

A 

B 

C 

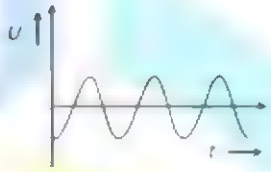
D 

Correct
Unattempted
Incorrect
5/10

Q :

As a body performs S.H.M., its potential energy U. varies with time as indicated in

A



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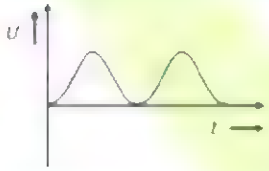

C

D

Explanation

PE varies from zero to maximum. It is always positive sinusoidal function.

Correct | Unattempted

Incorrect | 6/10

Q :

If the length of the simple pendulum is increased by 44%, then what is the change in time period of pendulum

A 22%

B 20%

C 33%

D 44%

Explanation

$$T = 2\pi\sqrt{\frac{l}{g}} \Rightarrow \frac{T_2}{T_1} = \sqrt{\frac{l_2}{l_1}} = \sqrt{\frac{144}{100}} = \frac{12}{10}$$

$$\frac{-T_1}{T_1} \times 100 = 20$$

Correct
Unattempted
Incorrect
7/10

Q :

To show that a simple pendulum executes simple harmonic motion, it is necessary to assume that

A Length of the pendulum is small

B Mass of the pendulum is small

C Amplitude of oscillation is small

D Acceleration due to gravity is small

Explanation

- If amplitude is large motion will not remain simple harmonic.

Correct | Unattempted

Incorrect | 8/10

Q :

A simple pendulum is taken from the equator to the pole. Its period

Decreases

Increases

Remains the same

Decreases and then increases

Explanation

As we go from equator to pole the value of g increases. Therefore time period of simple pendulum

$T a \sqrt{\frac{1}{g}}$ decreases

Correct | Unattempted
Incorrect | 9/10

Q :

Time period of a simple pendulum will be double, if we

A Decrease the length 2 times

B Decrease the length 4 times

C Increase the length 2 times

D Increase the length 4 times

Explanation

$T \propto \sqrt{l}$

Q :

Length of a simple pendulum is l and its maximum angular displacement is q, then its maximum K.E. is

A mglsinθ

B mgl(1+sinθ)

C mgl(1+cosθ)

D mgl(1−cosθ)

Explanation

- Kinetic energy will be maximum at mean position.

From law of conservation of energy maximum kinetic energy at mean position = Potential energy at displaced position

$K.E_{max}=mgh=mgl(1-\cos\theta)$

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Fizza Maryum,Javeria Shukor